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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/021,174	10/29/2001	David L. Angst	ANGST 1-1-11-21-26	3306

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EXAMINER
LEWIS, MONICA

ART UNIT	PAPER NUMBER
2822	

DATE MAILED: 08/28/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/021,174	ANGST ET AL.	
	Examiner	Art Unit	
	Monica Lewis	2822	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 October 2001* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *11-25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *11-25* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *29 October 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

1. This action is in response to the application filed October 29, 2001.

Specification

2. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 11-16 are rejected under 35 U.S.C. 102(b) as being anticipated by Kitagawa (Japanese Patent No. JP408236529A).

In regards to claim 11, Kitagawa discloses the following:

a) common base part (See Figure 4b and Figure 3b); and

b) a plurality of component parts bonded to the common base part by bonds at least partially composed of an intermetallic solder compound (See Figure 4b and Figure 3b).

In regards to claims 12 and 15, Kitagawa discloses the following:

a) the intermetallic solder compound is a ternary solder intermetallic compound (See Abstract).

In regards to claims 13 and 16, Kitagawa discloses the following:

a) the ternary intermetallic solder compound includes gold, tin, and an element selected from the group consisting of platinum, iron, cobalt and nickel (See Abstract).

In regards to claim 14, Kitagawa discloses the following:

a) a housing for packaging the circuit, the common base part being bonded to the housing by bonds at least partially composed of the intermetallic solder compound (See Abstract and Figure 4b).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 17-22 and 25 are rejected under 35 U.S.C. 103(a) as obvious over Kimura et al. (Japanese Patent No. JP08181392A).

In regards to claim 17, Kimura et al. ("Kimura") discloses the following:

a) a plurality of chemical element layers (See Figure 3); and

b) another one of the chemical element layers defining a solder quenching layer for application to a second part (See Figure 3).

In regards to claim 17, Kimura fails to disclose the following:

a) at least one of the chemical element layers defining a binary solder for application to a first part, the binary solder having a first melting temperature.

However, the limitation of "binary solder having a first melting temperature" makes it a product by process claim. The MPEP § 2113, states, "Even though product -by[-] process claims are limited by and defined by the process, determination of patentability is based upon the product itself. The patentability of a product does not depend on its method of production. If the product in product-by-process claim is the same as or obvious from a product of the prior art, the

claim is unpatentable even though the prior product is made by a different process." *In re Thorpe*, 227 USPQ 964, 966 (Fed. Cir. 1985)(citations omitted).

A *"product by process"* claim is directed to the product per se, no matter how actually made, *In re Hirao and Sato et al.*, 190 USPQ 15 at 17 (CCPA 1976) (footnote 3). See also *In re Brown and Saffer*, 173 USPQ 685 (CCPA 1972): *In re Luck and Gainer*, 177 USPQ 523 (CCPA 1973); In re Fessmann, 180 USPQ 324 (CCPA 1974); and *In re Marosi et al.*, 218 USPQ 289 (CAFC 1983) final product per se which must be determined in a *"product by, all of"* claim, and not the patentability of the process, and that an old or obvious product, whether claimed in *"product by process"* claims or not. Note that Applicant has the burden of proof in such cases, as the above caselaw makes clear.

b) the solder formed by the chemical element layers has a usage temperature which is substantially higher than the first melting temperature of the binary solder.

However, the limitation of "usage temperature which is substantially higher than the first melting temperature of the binary solder" makes it a product by process claim. The MPEP § 2113, states, "Even though product -by[-] process claims are limited by and defined by the process, determination of patentability is based upon the product itself. The patentability of a product does not depend on its method of production. If the product in product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product is made by a different process." *In re Thorpe*, 227 USPQ 964, 966 (Fed. Cir. 1985)(citations omitted).

A *"product by process"* claim is directed to the product per se, no matter how actually made, *In re Hirao and Sato et al.*, 190 USPQ 15 at 17 (CCPA 1976) (footnote 3). See also

In re Brown and Saffer, 173 USPQ 685 (CCPA 1972): *In re Luck and Gainer*, 177 USPQ 523 (CCPA 1973); In re Fessmann, 180 USPQ 324 (CCPA 1974); and *In re Marosi et al.*, 218 USPQ 289 (CAFC 1983) final product per se which must be determined in a *"product by, all of"* claim, and not the patentability of the process, and that an old or obvious product, whether claimed in *"product by process"* claims or not. Note that Applicant has the burden of proof in such cases, as the above caselaw makes clear.

In regards to claim 18, Kimura fails to disclose the following:

a) the binary solder comprises a sequence of chemical element layers each comprising a single chemical element of the binary solder, the chemical element layers forming a binary mixture close to the eutectic point of the chemical elements when melted at the first melting temperature.

However, the limitation of "binary mixture close to the eutectic point of the chemical elements when melted at the first melting temperature" makes it a product by process claim. The MPEP § 2113, states, "Even though product -by[-] process claims are limited by and defined by the process, determination of patentability is based upon the product itself. The patentability of a product does not depend on its method of production. If the product in product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product is made by a different process." *In re Thorpe*, 227 USPQ 964, 966 (Fed. Cir. 1985)(citations omitted).

A *"product by process"* claim is directed to the product per se, no matter how actually made, *In re Hirao and Sato et al.*, 190 USPQ 15 at 17 (CCPA 1976) (footnote 3). See also *In re Brown and Saffer*, 173 USPQ 685 (CCPA 1972): *In re Luck and Gainer*, 177 USPQ 523 (CCPA 1973); In re Fessmann, 180 USPQ 324 (CCPA 1974); and *In re Marosi et al.*,

218 USPQ 289 (CAFC 1983) final product per se which must be determined in a *"product by, all of"* claim, and not the patentability of the process, and that an old or obvious product, whether claimed in *"product by process"* claims or not. Note that Applicant has the burden of proof in such cases, as the above caselaw makes clear.

In regards to claim 19, Kimura fails to disclose the following:

a) the chemical element layers are gold and tin which form a binary solder mixture close to the eutectic point of gold-tin when melted at the first melting temperature.

However, the limitation of "binary solder mixture close to the eutectic point of gold-tin when melted at the first melting temperature" makes it a product by process claim. The MPEP § 2113, states, "Even though product -by[-] process claims are limited by and defined by the process, determination of patentability is based upon the product itself. The patentability of a product does not depend on its method of production. If the product in product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product is made by a different process." *In re Thorpe*, 227 USPQ 964, 966 (Fed. Cir. 1985)(citations omitted).

A *"product by process"* claim is directed to the product per se, no matter how actually made, *In re Hirao and Sato et al.*, 190 USPQ 15 at 17 (CCPA 1976) (footnote 3). See also *In re Brown and Saffer*, 173 USPQ 685 (CCPA 1972): *In re Luck and Gainer*, 177 USPQ 523 (CCPA 1973); In re Fessmann, 180 USPQ 324 (CCPA 1974); and *In re Marosi et al.*, 218 USPQ 289 (CAFC 1983) final product per se which must be determined in a *"product by, all of"* claim, and not the patentability of the process, and that an old or obvious product, whether claimed in *"product by process"* claims or not. Note that Applicant has the burden of proof in such cases, as the above caselaw makes clear.

In regards to claim 20, Kimura discloses the following:

a) the quenching layer comprises an element selected from the group consisting of platinum, iron, cobalt and nickel (See Abstract and Figure 3).

In regards to claim 21, Kimura discloses the following:

a) a wetting layer (See Abstract and Figure 3).

In regards to claim 22, Kimura discloses the following:

a) the wetting layer comprises gold (See Abstract and Figure 3).

In regards to claim 25, Kimura discloses the following:

a) the solder comprises a ternary compound (See Abstract).

7. Claims 23 and 24 are rejected under 35 U.S.C. 103(a) as obvious over Kimura et al. (Japanese Patent No. JP08181392A) in view of Tatsumi et al. (Japanese Patent No. JP08148496A).

In regards to claim 23, Kimura fails to disclose the following:

a) an anti-oxidation layer.

However, Tatsumi et al. ("Tatsumi") discloses a platinum layer (See Abstract). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Kimura to include platinum as disclosed in Tatsumi because it has excellent bonding reliability.

In regards to claim 24, Kimura fails to disclose the following:

a) an anti-oxidation layer comprises platinum.

However, Tatsumi discloses a platinum layer (See Abstract). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the

semiconductor device of Kimura to include platinum as disclosed in Tatsumi because it has excellent bonding reliability.

Conclusion

8. The following prior art made of record and not relied upon is considered pertinent to applicant's disclosure: a) Rosier (U.S. Patent No. 3,593,06) discloses a bus bar transistor; b) Rai-Choudhury (U.S. Patent No. 3,925,808) discloses a silicon semiconductor device; c) Melton (U.S. Patent No. 5,282,565) discloses a solder bump interconnection; d) Aulicino et al. (U.S. Patent No. 5,658,827) discloses a method for forming solder balls; e) Chirovsky et al. (U.S. Patent No. 5,667,132) discloses a method for solder bonding contact pad arrays; f) Mori et al. (U.S. Patent No. 5,691,210) discloses a method of fabricating a probe structure; g) Queyssac (U.S. Patent No. 5,714,803) discloses a low profile removable ball grid array; h) DiGiacomo (U.S. Patent No. 5,831,336) discloses a ternary solder; i) Itai et al. (U.S. Patent No. 5,838,069) discloses a ceramic substrate having pads; j) Kogasiwa (Japanese Patent No. JP03283542A) discloses bonding of a chip; k) Tokyo Shibaura Electric (Japanese Patent No. JP56056644A) discloses a low thermal fatigue device; l) Mita et al. (Japanese Patent No. JP361113246A) discloses manufacturing a semiconductor device; m) Watanabe (Japanese Patent No. JP402128486A) discloses a joining layer of a laser element; and n) Fujitsu (Japanese Patent No. JP08290288A) discloses lead less solder.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Monica Lewis whose telephone number is 703-305-3743. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead, Jr. can be reached on 703-308-4940. The fax phone number for the organization where this application or proceeding is assigned is 703-308-7722 for regular and after final communications. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

ML

August 22, 2002

Stephen D. Meier
Primary Examiner